

At Concluded
33. (New) The cylinder of claim 15 wherein said cylinder outer body has a wall thickness and an axial length and further wherein a ratio of said wall thickness to said axial length is in a range of 1:200 to 1:1200.

34. (New) The cylinder of claim 33 wherein said range is between 1:400 and 1:1000.

REMARKS

The specification of the subject patent application, as set forth in the verified translation of the German language text of PCT/DE00/03489, has been cancelled in favor of the accompanying Substitute Specification. A suitable Abstract has been added. Original claims 1-14 have been cancelled in favor of new claims 15-34. These new claims are similar in content to the claims now pending in the PCT application and have been re-written to avoid multiple dependencies and to generally place them in a form more in accordance with U.S. practice. No new matter is being added. Entry of this Preliminary Amendment into the file of the subject patent application prior to the

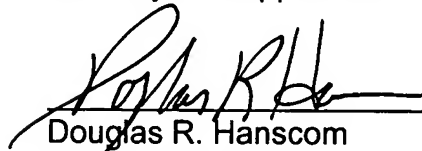
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calculation of the filing fee, and prior to an examination of the application on the merits
is respectfully requested.

Respectfully submitted,

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The cylinder in accordance with the claimed invention is easily produced in a cost-effective manner. It allows the maintenance of a pre-selectable temperature across the entire shell surface of the cylinder. When the cylinder is provided with clamping channels or conduits on its outer body, the use of a multiplex-threaded spiral shaped conduit provides the required amount of flow of the tempering fluid. If the cylinder outer body is thin walled, a specific ratio is maintained between the gap cross-section area and the outer shell area. Again, this insures a uniform surface temperature across the entire shell surface of the cylinder.

In the Office Action of April 22, 2003, claims 15-34, all of the claims pending in the application, were provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 17-48 of copending application No. 10/089,070 to Dauner et al. The Examiner noted that this is a provisional rejection because the claims of the conflicting application have not yet been patented.

Applicants' principal representatives have authorized the undersigned to execute a suitable terminal disclaimer for filing in the subject application in response to the allowance of claims in the companion application. The actual preparation and filing of such a terminal disclaimer will be held in abeyance pending the allowance of claims in the companion application.

Claims 21-24, 26, 28, 30 and 32 were objected to because of several informalities in independent claim 21. That claim has been amended in a manner which is believed to overcome the informalities noted. It is believed that these changes

overcome the Examiner's objections to these claims.

Claims 15-20, 25, 27, 29, 31, 33 and 34 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent No. 5,784,957 to Rau in view of U.S. patent No. 3,847,212 to Withers, Jr. Claims 21-24, 26, 28, 30 and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rau, U.S. patent No. 5,595,115.

Turning initially to the rejection of claims 15-20, 25, 27, 29, 31, 33 and 34, claim 15 has been amended in an effort to more clearly patentably define the subject invention over Rau '957 in view of Withers. It is believed that claim 15, and the claims that depend from it, are not obvious to one of skill in the art over this combination of references.

Rau '957 shows a printing mechanism that includes a form cylinder 43, as seen in Fig. 3. The form cylinder 43 includes a separating tube 51 and a concentric cylinder jacket 50. A cooling chamber 53 is defined by the annular space between the separating tube 51 and the cylinder jacket 50. Spiral guide plates or baffle plates 78 are interposed between the two. These spiral guide plates or baffle plates 78 are recited at Column 4, lines 8 and 9 as advantageously effecting the circulation in the cooling chamber 53.

It is asserted in the Office Action that a flow path 53 is defined by the cylinder base body circumference and the cylinder body in Rau '957 and that the cylinder base body has a spiral shaped conduit, also indicated at 53. The Rau '957 reference is also asserted as having strips 78 on the cylinder base body circumference, which strips

support the cylinder outer body on the cylinder base body.

A review of the Rau '957 patent shows that there are spiral guide plates or baffle plates 53. These are depicted in Fig. 3 in somewhat schematic fashion. It is noted that Fig. 3 is a sectional view yet the ends of the spiral guide plates or baffle plates 53 are not shown as cross-sections. It is also noted that the flow path arrow in the cooling chamber 53 is a straight arrow extending in an axial direction of the cylinder 43. It is further noted that the spiral guide plates or baffle plates 78 are not depicted, and certainly are not recited in the specification of the patent as being connected to either the separation tube 51 or the cylinder jacket 50. While it is acknowledged that these plates or baffles 78 are not free floating, it is also not clear that they have the structure or functions attributed to them by the Examiner.

The secondary reference to Withers does not show multiplex-threaded spiral shaped conduits. In Withers there is shown a heat transfer tube that has a plurality of radially extending external fins 12 and 14. The interior of the tube wall has a plurality of multiple start internal ridges 16 and 18. The function of these ridges is to "perturb" the fluid flowing in the tube, as recited at Column 2, line 25. Further in Column 2, at line 65 it is recited that the tube is multiple start internally ribbed. The Examiner has asserted that this language somehow teaches one that Rau '957 could be modified to have multiplex-threaded spiral conduits.

It is respectfully asserted that, at best Withers teaches that the spiral guide plates or baffle plates 78 of Rau could be provided with multiple starts, as taught by

Withers. That does not teach or suggest a multiplex-threaded spiral shaped conduit, as recited in claim 15. If anything the structure which would result from a combination of Rau '957 and Withers would be a cylinder with a discontinuous arrangement of spiral guide plates or baffle plates, i.e. an arrangement where each guide plate or baffle plate would have multiple starts. This would be in the nature of a screw thread that is interrupted by a plurality of axially extending slots or cuts. That is what is meant by a multiple start internally ridged tube. That is not the same as a multiplex-threaded spiral shaped conduit as discussed in detail in the specification of the subject application, and as seen in Fig. 1 and even more clearly in Fig. 4 which shows a plurality of radially separated distribution chambers 16 and radially inwardly extending bores 19 at the opposing ends of the spiral conduits 17. The discussion at paragraph 28 of the specification provides further support to the understanding that a multiplex-threaded spiral shaped conduit provides an increased total cross section of flow Q which is the sum of the cross sections of the individual distribution conduits 17.

Such a structure, as recited in claim 15, is not taught or suggested by either Rau '957 or Withers taken either singly, or in combination. It is further asserted that a person of skill in the art of printing presses would not be apt to look to the field of heat transfer tubes to find any usable teachings. Thus claim 15, as filed, and even more clearly as amended, is believed to be patentable over the combination of references applied in its rejection.

Claims 16-20, 25, 27, 29, 31, 33 and 34 all depend, either directly or indirectly from believed allowable amended claim 15. These claims are also believed to be allowable.

Turning now to the rejection of claims 21-24, 26, 28, 30 and 32 it is believed that these claims are also not obvious to one of skill in the art in view of the teachings of U.S. patent No. 5,595,115, also to Rau. This reference is directed to a printing mechanism and shows in Fig. 3 essentially the same structure as was shown in Fig. 3 of Rau '957 with the absence of the spiral guide plates or baffle plates. The assertion is made that it would be obvious to one of skill in the art to modify Rau '115 to arrive at a gap ratio in the range recited in claim 21 of the subject application. That assertion is not supported by any teaching or suggestion in Rau '115. In fact, Rau '115 appears to show a substantially larger gap cross section area so that a ratio of 1:5 or 1:10 would be more appropriate.

The specification of the subject application discusses in some detail the ratios between the gap cross section area and the shell surface area. It is submitted that these ratios are not a mere matter of optimum dimensions that could be easily determined. They are carefully selected to provide a cylinder with an outer shell that is self-supporting yet thin enough to allow proper heat transfer, and a gap that will provide a high fluid velocity which helps to avoid laminar flow on the wall of the outer body, since such laminar flow would decrease heat transfer. The claimed ratio range also gives rise to a strongly forced fluid flow. This again increases heat transfer efficiency.

For these reasons, it is believed that claim 21, as filed, and even more clearly as amended, is patentable. Claims 22-24, 26, 28, 30 and 32 depend from believed allowable claim 21, as amended, and are also believed to be allowable.

The various other references cited in the Office Action, but not applied against the claims, have been reviewed. Since they were not relied on in the rejections of the claims, no further discussion thereof is believed to be required.

SUMMARY

The Substitute Specification has been amended to correct two minor typing errors. Neither of these constitute any new matter. Claims 15, 16, 18 and 21 have been amended. Claims 17, 19, 20 and 22-34 have been carried forward. It is believed that the claims now pending in the subject application are patentable over the prior art cited and relied on by the Examiner, taken either singly or in combination. Allowance of the claims, and passage of the application to issue is respectfully requested.

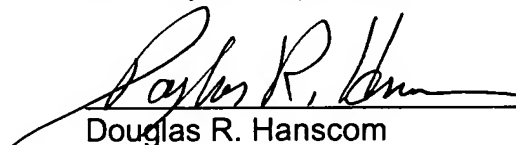
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MARKED-UP COPY OF SPECIFICATION**SCHNEIDER - W1.1706PCT-US**

[Specification]

Cylinder for a Rotary Press

FIELD OF THE INVENTION

[001] The present invention relates to a cylinder for a rotary press [in accordance with the preamble of claim 1 or 6]. The cylinder includes a base body and an outer body. A tempering medium can flow between the two bodies

DESCRIPTION OF THE PRIOR ART

[002] A temperable cylinder for a rotary printing press is known from DE 197 12 446 A1. A[, wherein a] heat exchanger consisting of several tubes is arranged inside a hollow chamber of the cylinder and in turn is surrounded by a heat-transferring stationary fluid.

[003] EP 0 557 245 A1 discloses a temperable forme cylinder with a clamping conduit extending axially over the jacket surface. Conduits[, wherein conduits] extending axially in respect to the cylinder have been cut into the cylinder in the vicinity of the periphery, through which coolant flows.

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[004] EP 0 733 478 B1 shows a friction roller embodied as a tube, wherein coolant flows through the entire hollow space between an axial conduit, through which coolant is conducted, and the tube.

[005] A temperable double-jacket drying cylinder is known from DE-PS 929 830. Steam flows in the space between an outer jacket and an inner jacket, into which ribs have been cut in a spiral pattern.

[006] EP 0 652 104 A1 discloses a cylinder which is provided with interior cooling to prevent the build-up of ink. For this purpose, coolant flows through an annular gap, in which spiral-shaped guide plates can also be arranged for improving the circulation.

SUMMARY OF THE INVENTION

[007] The object of the present invention is directed to providing [based on creating] a cylinder of a rotary printing press.

[008] In accordance with the present invention, this object is attained by providing the cylinder with a cylinder base body and a cylinder outer body. A tempering medium can flow between the base body and the outer body. A circumferential surface

of the base body has a spiral-shaped conduit, and the outer body has an inner surface.

These two surfaces define the tempering medium flow path [means of the characteristics of claims 1 or 6].

[009] The advantages which can be achieved by [means of] the present invention lie primarily in that a temperable cylinder can be produced in a cost-effective manner from simple components. Because [By means] of this, a pre-selectable temperature is achieved, which is almost evenly distributed over the entire jacket surface of the cylinder. A temperature profile which fluctuates in the circumferential direction of the cylinder or which is uneven, such as can occur, for example, in connection with individual axially extending conduits and/or with wall thicknesses which are too small in comparison with the distance of the conduits, is avoided.

[010] In an advantageous embodiment, a chamber, through which a tempering medium is conducted, is of such dimensions in the radial direction on the inside of the cylinder jacket, that a forced flow also takes place directly on the jacket surface.

[011] A low wall thickness of the outer body separating the jacket surface and the tempering medium is particularly advantageous in respect to the fastest possible

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reaction time of the tempering process, for example for inking rollers, in particular screen or anilox rollers, or for forme, transfer or satellite cylinders without a device for fastening dressings, such as bracing or clamping conduits, extending radially into the interior of the jacket surface.

[012] In a preferred embodiment of the present invention, a wall thickness of a temperable forme or transfer cylinder having one or several clamping or bracing conduits on its shell surface is so great that the clamping conduit comes to lie entirely inside the wall.

[013] Tempering which is even in the circumferential and in the axial directions is achieved by use [means] of a tempering medium flowing in the axial direction through a narrow gap between the outer body and the base body of the cylinder on the entire circumference.

[014] In a further advantageous embodiment, an even more strongly directed flow is generated by use [means] of a groove extending spirally on the outer surface of the base body.

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[015] Cooling, by use [means] of the above mentioned spiral conduit, is furthermore advantageous, in particular for screen or anilox rollers, wherein the outer body is supported on the strips and is therefore constructed with thin walls.

BRIEF DESCRIPTION OF THE DRAWINGS

[016] Preferred [Exemplary] embodiments of the present invention are represented in the drawings and will be described in greater detail in what follows:

[017] Shown are in:

Fig. 1, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a spirally extending conduit,

Fig. 2, a cross section through a temperable cylinder in accordance with

Fig. 3,

Fig. 3, a longitudinal sectional view through a temperable cylinder, which has a device for fastening a dressing and with a gap between the base body and the outer body,

Fig. 4, a longitudinal sectional view through a temperable, thin-walled cylinder with a spirally extending conduit,

Fig. 5, a cross section through a temperable cylinder in accordance with

Fig. 4, and in

Fig. 6, a longitudinal sectional view through a temperable cylinder with a

gap between the base body and the outer body.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[018] A temperable cylinder 01 of a printing press, in particular of a rotary printing press, has a cylinder base body 02, for example of a tube-shape or solid, which is surrounded by an outer cylinder body 03 of a circular cross section, for example a tube 03.

[019] On its ends, the cylinder base body 02 is fixedly connected with respective journals 04, 06, which journals 04, 06 are rotatably seated, by means of bearings 07, in lateral frames 08, 09. It is possible to connect one of the journals 04, 06, for example the right journal 06, with a drive motor or with a drive wheel, not specifically represented, fixed in place on the frame.

[020] The other journal 04 has an axial bore 11, which receives a conduit 12 that forms [as] the supply [feed] line 12 for a liquid or a gaseous tempering medium,

such as, for example, CO₂, water, oil, etc. In an advantageous embodiment, the axial bore 11 of the journal 04 has an interior diameter d11 which is greater than an exterior diameter d12 of the supply line or conduit 12. Therefore, a removal line 13 of a circular cross section remains open in the area of the journal 04 and around the supply line or conduit 12, through which the tempering medium leaves the cylinder 01, again via the journal 04. The supply line or conduit 12 for supplying the tempering medium extends from the left journal 04 [almost] axially through the cylinder base body 02 as far as the right journal 06 and terminates in radially outwardly extending bores 14. The bores 14 terminate in a distributing chamber 16, which chamber 16 extends around the entire circumference on an [the] inside surface of the outer cylinder body 03. From the distributing chamber 16, the tempering medium flows in the axial direction A through at least one distribution conduit 17 arranged between the cylinder base body 02 and the outer cylinder body 03 back to the left journal 04, where it terminates in a collecting chamber 18 and is received in [reaches] the annular [ring-shaped] removal line 13 via radially inwardly extending bores 19.

[021] The supply line 12 and the removal line 13 are connected with [the]

removal and supply connections [flow] of a tempering device, in a manner not specifically represented in the drawings.

[022] It is possible, in [provided by] an embodiment variation, not specifically represented, to provide the supply and removal of the tempering medium separately via the respective journals 04, 06.

[023] In a first preferred [exemplary] embodiment, as seen in Fig. 1 [(Fig. 1)], the cylinder 01 is embodied as a forme cylinder 01 or as a transfer cylinder 01 which, on a shell surface 21 of the outer cylinder body 03, has at least one fastening device 22, for example a bracing conduit 22, a magnet close to the shell surface, or another fastening device 22 [other means], extending axially in respect to the cylinder 01, for fastening a dressing or a cover, for example a printing forme or a rubber blanket to the cylinder 01. A [The] wall thickness h_{03} of the outer cylinder body 03 is greater than a [the] depth h_{22} of the bracing conduit 22, as seen in Fig. 2, so that an uninterrupted and circular inner surface 23 is formed on the inside of the outer cylinder body 03, which makes possible a cost-effective construction and above all even tempering. The wall thickness h_{03} has a range of [lies], for example, between 40 and 70 mm, in

particular between 55 and 65 mm. The[, wherein the] depth h22 of the bracing conduit 22 lies between 20 and 45 mm. In Figs. 1 and 2, two bracing conduits 22 are provided in the circumferential direction of the cylinder 01, however, the upper bracing conduit 22 is shown in dashed lines [only sketched in] for reasons of clarity.

[024] In this first preferred [exemplary] embodiment, the distribution conduit 17 is embodied as a spiral groove 17 in the axial direction A on a circumference 24 of the cylinder base body 02. This spirally turning groove 17 of a width b17 and a depth h17 is covered by [means of] the outer cylinder body 03, for example by having body 03 [being] shrunk on[, wherein the]. The inner surface 23 of the outer cylinder body 03 rests on a protrusion 26 forming the groove 26, for example a strip 26 of a width b26.

[025] The distribution conduit or spiral groove 17 is connected, at its start 27, with the distributing chamber 16 and at its end with the collecting chamber 18. The distributing chamber 16 and the collecting chamber 18 are, for example, each designed as an annular groove 16, 18, each of which is formed by a shoulder on the circumference of the area of the journals 04, 06 near the cylinder base body and a front face of the cylinder base body 02, and is also covered by the outer cylinder body 03.

[026] In the case of a forme cylinder 01 of double-sized circumference, i.e. two printing formats in the circumferential direction, the diameter of the forme cylinder 01 is, for example, between 320 and 400 mm, in particular 360 to 380 mm.

[027] The depth h17 and width b17 of the distribution conduit or groove 17, as well as the width b26 of the strip 26, and the number of distribution conduits 17 determine the flow-through amount of tempering medium per unit of time, and alternatingly the required pressure as well as the lead of the spiral groove 17, and therefore the tempering behavior.

[028] In an advantageous embodiment, the circumference 24 of the cylinder base body 02 has several, for example four or eight, distribution conduits or grooves 17 starting in the distributing chamber 16 and ending in the collecting chamber 18. The [, the] starts 27 and ends 28 of each of these distribution conduits 17 are offset by 90° or 45° in the circumferential direction. In this way, with the same conduit geometry a multiplex-threaded, for example quadruply- or octuply-threaded groove 17, has an increased total cross section Q, i.e. the sum of the cross sections of the individual distribution conduits 17, and an increased lead S, and therefore also a reduced flow

path and lesser pressure loss.

[029] In the example, the circumference 24 of the cylinder base body 02 has a quadruply-threaded distribution conduit 17, wherein the width b17 of the distribution conduit or groove 17 respectively lies between 10 and 20 mm, for example at 15 mm, and the width b26 of the strip 26 respectively lies between 3 and 7 mm, for example at 5 mm. The depth h17 of the distribution conduit 17 is respectively 10 to 15 mm, for example 12 mm. The quadruply-threaded distribution conduit 17 therefore has a lead S of, for example, 52 to 108 mm, in particular of 80 mm.

[030] A total cross section Q for the flow of the tempering medium is advantageously 600 to 800 mm². If increasing the wall thickness h03 of the outer cylinder body 03, while at the same time retaining the cylinder diameter d01 and reducing the inner radius r17 of the spiral distribution conduit or groove 17, the depth h17 of the conduit or groove 17 must be increased at the same ratio as the inner radius r17 of the conduit or groove 17 is reduced, so that the total cross section Q remains at least at the order of magnitude, for example greater than or equal to 710 mm². In this way, the supply to, or removal of heat from a shell surface 21 of the forme cylinder 01

remains assured. For the determination of the total cross section Q, the approximate inner radius r17 should be applied for depths h17 which are small in comparison with the inner radius r17, otherwise as usual the inner radius r17 plus half the depth h17.

The ratio between the tempered shell surface 21 and the total cross section Q lies for example between 1000 and 1800 [mm²].

[031] In a second preferred [exemplary] embodiment, as depicted in Fig. 3, [(Fig. 3)] of a forme cylinder 01, the distribution conduit 17 is produced, not as a spiral groove 17, but as an open gap 17 with an annular clear profile between the cylinder base body 02 and the outer cylinder body 03. The supply and removal of the tempering medium takes place in the same or similar way as in the first preferred [exemplary] embodiment, shown in Fig. 1 [(Fig. 1)]. In place of the radially extending bores 19, 14, the journal 04, 06 [08] is embodied in several pieces and in this way permits the penetration of the tempering medium from the supply line 12 into the distributing chamber 16, or from the collection chamber 18 to the removal line 13. In the second preferred [exemplary] embodiment, the supply line 12 is embodied in a two to four [two-] piece manner, wherein a supply conduit 12 penetrating the journal 04 terminates in a

conduit leading through the cylinder base body 02.

[032] The clearance h_{17} of the distribution conduit [gap] 17, together with an inner radius r_{17} of the rotary shaft of the cylinder 01 on which the [gap] distribution conduit [17] is arranged, determines the flow conditions and therefore also the tempering behavior. Too narrow a clearance increases the required pressure, or reduces the amount of flow-through, while too [to] large a clearance might not result in the assured direction of the flow directly onto the surface 23 of the outer cylinder body 03 because of high centrifugal forces occurring and friction occurring in the area of the surface 23 in the course of the rotation of the cylinder.

[033] In an advantageous embodiment of a forme cylinder 01, the gap of the distribution conduit 17 is arranged at the inner radius r_{17} of 80 to 120 mm, in particular between 100 and 115 mm. The clearance h_{17} of the gap is between 2 to 5 mm, preferably 3 mm. The wall thickness h_{03} of the outer cylinder body 03 is designed to be between $h_{03} = 40$ mm and $h_{03} = 70$ mm, in particular between 55 and 65 mm. In this embodiment of the tempering device, the outer cylinder body 03 should be designed to be self-supporting over a length l_{01} , for example $l_{01} = 800$ to 1200 mm, of

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the barrel of the cylinder 01, or a length l_{03} , for example $l_{03} = 800$ to 1200 mm, of the outer cylinder body 03. Thus, with a depth h_{22} of the bracing conduit 22 between 20 and 45 mm, a sufficient strength of the outer cylinder body 03 remains in the area of the bracing conduit 22. As in the first preferred [exemplary] embodiment, the clearance h_{17} of the gap should be increased in an advantageous manner at the ratio of a reduction of the inner radius r_{17} if the wall thickness h_{03} is increased and the gap in the distribution conduit 17 is moved further into the interior of the cylinder 01, and vice versa. For example, the total cross section Q lies between 1300 and 3500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 lies, in this embodiment, between 300 and 900 [mm²], for example, and in particular between 500 and 650 [mm²]. The remaining preferred dimensions of the forme cylinder 01 explained in the first preferred [exemplary] embodiment should also be employed with the second preferred [exemplary] embodiment and will not be stated again.

[034] In [a] third and a fourth preferred embodiments, as shown in [exemplary embodiment (]Figs. 4 and 6[)], the cylinder 01 is embodied as a temperable roller 01,

for example an inking roller 01, and in particular a screen roller 01 or an anilox roller 01.

The supply and removal of the tempering medium, as well as the seating in lateral walls 08, 09 takes place in the same or similar manner as in the first or second preferred [exemplary] embodiments.

[035] In the third preferred [exemplary] embodiment, which is shown in Fig. 4, [(Fig. 4)] a spiral-shaped, multiplex-threaded, preferably octuply-threaded, distribution conduit 17 is arranged on the circumference 24 of the cylinder base body 03, in the same manner as in the first preferred [exemplary] embodiment. The distributing chamber 16 and the collecting chamber 18 each have eight radial bores 14, 19 and are connected, equidistant in relation to the circumferential direction, with eight starts 27 and eight ends 28 respectively, of the octuply-threaded distribution conduit or conduits 17. In the example, the distribution conduits 17 have been embodied as grooves 17, each with a segment-like, for example with a semicircular profile, for advantageous mechanical and satisfactory flow properties.

[036] The multiplex-threaded distribution conduit 17 is embodied in an advantageous manner as octuply-threaded, since it is possible with the same geometry

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of the conduit 17 to either conduct twice the amount of tempering medium at a steady pressure loss through the conduit 17, or the same amount of tempering medium at a reduced pressure.

[037] As in the first exemplary embodiment, the groove 17 is covered by [means of] the outer cylinder body 03, which is, for example, shrunk on. Tempering, by use [means] of the spiral-shaped distribution conduit or groove 17, is particularly advantageous in case an effective and fast reacting tempering of the outer cylinder body 03 is required, such as is represented by ink-conducting inking rollers 01 and screen_rollers 01. The less the wall thickness h_{03} of the outer cylinder body 03, as shown in Fig. 5 [(Fig. 5)], the faster the reaction on the shell surface 21 takes place in case of a change of the operating temperature. In the example, the outer cylinder body 03 is made with a very small wall thickness h_{03} and is not self-supporting, i.e. it is supported on strips 26. The width of the groove 17 determines the mechanically still permissible wall thickness h_{03} of the outer cylinder body 03, and vice versa. The permissible width b_{26} of the strip 26 and the minimum wall thickness h_{03} determine each other mutually, since a temperature profile on the shell surfaced 21 of the outer

cylinder body 03 should be avoided if possible.

[038] In an advantageous embodiment, the temperable roller 01 has a diameter d_{01} between 160 and 200 mm, in particular 180 mm. The wall thickness h_{03} of the outer cylinder body 03 is 1 to 4 mm, for example $h_{03} = 2$ mm (not counting a coating of a total of 200 to 400 μm possibly to be applied), the length l_{03} of the outer cylinder body 03 lies between 800 and 1200 mm. A ratio V between the length l_{03} and the wall thickness h_{03} lies, for example, between 1:200 and 1:1200 [200 and 1200 mm], in particular between 1:400 and 1:1000 [400 and 1000 mm]. In the area which acts together with the surface 23 of the outer cylinder body 03, the strip 26 has a width b_{26} of 2 to 4 mm; in particular $b_{26} = 3$ mm. In the area which acts together with the surface 23 of the outer cylinder body 03, the conduit 17 has a width b_{17} between 8 and 13 mm, in particular 10 to 12 mm. In the example, the profile of the conduit 17 is semicircular-shaped, so that a maximum depth h_{17} of the conduit 17 is 4 to 7 mm, in particular $h_{17} = 5$ mm. The total cross section of the octuply- threaded distribution conduit or conduits 17 comes to 300 to 450 mm^2 , and can be approximately compared to the total cross section Q in the quadruply-threaded first preferred [exemplary] embodiment, if the shell

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surface 21 to be cooled is taken into consideration. Here, too, an increase of the amount of tempering medium flowing per unit of time and, if possible, of a contact surface of the tempering medium with the surface 23 of the outer cylinder body 03, should at least be kept at an order of magnitude where the geometries of the roller 01 change while the shell surface 21 to be cooled remains the same. The ratio between the shell surface 21 to be tempered and the total cross section Q lies, for example, between 1:1200 and 1:1600 [1200 and 1600 mm²].

[039] In the fourth preferred [exemplary] embodiment, which is depicted in Fig. 6 [(Fig. 6)], the cylinder 01 embodied as a roller 01 has a gap 17, which is annular in profile, as the distribution conduit 17, in a manner comparable with the second preferred [exemplary] embodiment. As in the third preferred [exemplary] embodiment, the roller 01 has a diameter d01 of approximately 160 to 200 mm. The[, wherein the] supply and the removal of the tempering medium is designed in accordance with one of the previous preferred [exemplary] embodiments.

[040] In contrast to the third preferred [exemplary] embodiment, the outer

cylinder body 03 [here] is embodied to be self-supporting over the length l01 of, for example 800 to 120 mm, and has a wall thickness h03 of 5 to 20 mm, for example, and in particular of 5 to 9 mm. The clearance h17 of the distribution conduit or gap 17 is 2 to 5 mm, preferably 3 mm, wherein the distribution conduit or gap 17 is arranged on an inner radius of 60 to 100 mm, in particular 80 mm. The total cross section Q through which flow occurs lies, for example, between 1000 and 2500 mm², in particular at approximately 1500 mm². The ratio between the shell surface 21 to be tempered and the total cross section Q of the conduit 17 lies; for example, between 200:1 and 600:1 [200 and 600 mm²], in particular between 300:1 and 500:1 [300 and 500 mm²].

[041] The roller 01, preferably designed as a screen roller 01, from the third and the fourth preferred [exemplary] embodiments can have profiling on its shell surface 21, such as, for example, ink-conducting small cups. The [On the] shell surface 21 of the outer cylinder body 03 [it] can preferably have a chromium-nickel coating and a ceramic coating, each of a thickness of 100 to 200 µm, wherein the latter has the profiling, or the small cups.

[042] It is advantageous for the embodiments of tempering by use [means] of a

spiral-shaped conduit 17, to select the ratio between the shell surface 21 to be tempered and the total cross section Q of the distribution conduit 17 between the cylinder base body 02 and the outer cylinder body 03 through which a flow occurs to be less than 1:2000 [2000 mm²], in particular between 1:1800 and 1:1000 [1800 and 1000 mm²]. In an advantageous manner, the width b₂₆ of the strip is less than or equal to twice, and in particular one and one half times, the wall thickness h₀₃ of the outer cylinder body 03.

[043] The design of the outer cylinder body 03 is particularly advantageous, wherein it is a thin-walled tube 03 of a wall thickness d₀₃ less than or equal to 5 mm, in particular less than 3 mm, which is mechanically supported on the strips 26, which are spaced apart in the axial direction A.

[044] The arrangement for tempering represented in the third preferred [exemplary] embodiment can, in an advantageous further development, also be a forme cylinder, which has no fastening device embodied as clamping or bracing conduits, such as is the case, for example, when using printing sleeves in place of printing plates, or with shell surfaces 21 of forme cylinders 01, on which images are directly placed.

There, too, a directed, fast reacting tempering in accordance with the third preferred
[exemplary] embodiment is then also advantageous.

[045] While preferred embodiments of a cylinder for a rotary printing press in
accordance with the present invention have been set forth fully and completely
hereinabove, it will be apparent to one of skill in the art that various changes in, for
example, the specific type of printing press used, the drive for the cylinders and the like
could be made without departing from the true spirit and scope of the present invention
which is accordingly to be limited only by the following claims.

WHAT IS CLAIMED IS:

1.0089071.040802
208040.7068001

[List of Reference Symbols

01 Cylinder, forme, transfer cylinder, roller, inking,
screen, anilox roller

02 Cylinder base body (01)

03 Outer cylinder body (01)

04 Journal (02)

05 -

06 Journal (02)

07 Bearing

08 Lateral frame

09 Lateral frame

10 -

11 Axial bore

12 Supply line, conduit

13 Removal line

14 Bore, radial]

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[15 -

16 Annular groove, distributing chamber

17 Conduit, groove, gap

18 Collecting chamber, annular groove

19 Bore, radial

20 -

21 Shell surface (03)

22 Fastening device, bracing conduit

23 Surface (03)

24 Circumference (02)

25 -

26 Protrusion, strip

27 Start (17)

28 End (17)

b17 Width (17)]

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[WO 01/26903]

[PCT/EP00/03489]

[b26 Width (26)

d01 Diameter (01)

d11 Inner diameter (11)

d12 Outer diameter (12)

h02 Wall thickness (02)

h03 Wall thickness (03)

h17 Depth, clearance (17)

h22 Depth (22)

l01 Length (01)

l03 Length (03)

r17 Inner radius (17)

A Axial direction (01)

Q Total cross section

S Lead

V Ratio (l03, h03)]

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